

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date
15 January 2004 (15.01.2004)

PCT

(10) International Publication Number
WO 2004/004922 A1

(51) International Patent Classification⁷: **B05B 11/06**,
A61M 15/00, 15/08

(21) International Application Number:
PCT/GB2003/002961

(22) International Filing Date: **9 July 2003 (09.07.2003)**

(25) Filing Language: **English**

(26) Publication Language: **English**

(30) Priority Data:
0215904.4 9 July 2002 (09.07.2002) GB
0227345.6 22 November 2002 (22.11.2002) GB

(71) Applicant (*for all designated States except US*): **OPTINOSE AS [NO/NO]**; Lokkaskogen 18c, N-0773 Oslo (NO).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): **DJUPESLAND,**

Per, Gisle [NO/NO]; Lokkaskogen 18c, N-0773 Oslo (NO). **YOUNG, Matthew, Egerton [GB/GB]**; 38 Charnmans Way, Overnach, Cambridgeshire CB4 5PZ (GB). **FRY, Andrew, Robert [GB/GB]**; 13 Greenhill Park, Barnet, Hertfordshire EN5 1HQ (GB). **HURLSTONE, Christopher, John [GB/GB]**; 5 Bury Water Cotts, Bury Water Lane, Newport, Saffron Walden, Essex CB11 3TZ (GB).

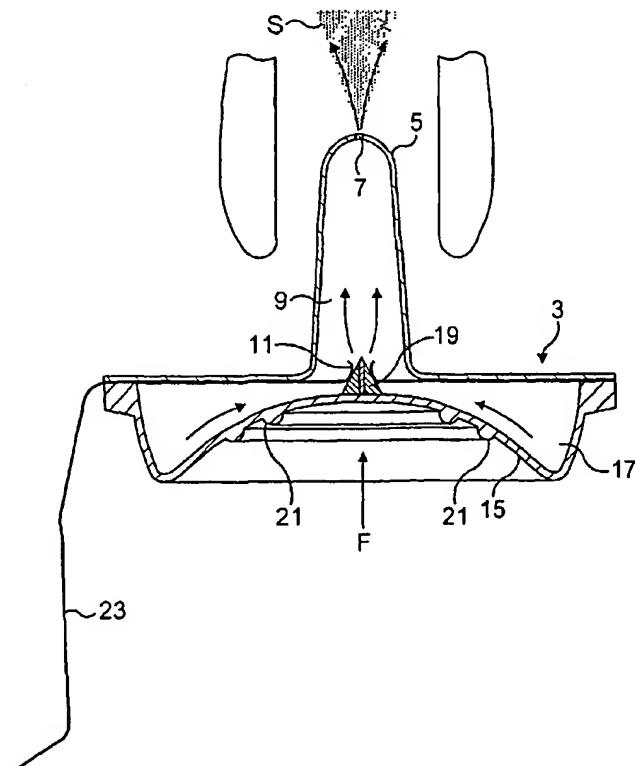
(74) Agent: **BODEN, Keith, McMurray; Fry Heath & Spence LLP**, The Gables, Massetts Road, Horley, Surrey RH6 7DQ (GB).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC,

[Continued on next page]

(54) Title: **DELIVERY DEVICES**

WO 2004/004922 A1



(57) Abstract: A delivery device for and method of delivering substance, the delivery device comprising: a delivery outlet (7) from which substance (5) is in use delivered; a gas chamber (17) containing a gas and being of reducible volume, wherein a reduction in the volume of the gas chamber (17) to a predetermined volume acts to pressurize the contained gas to a predetermined pressure; a seal element (11) disposed between the gas chamber (17) and the delivery outlet (7); and an opening mechanism configured, on reduction of the volume of the gas chamber to a predetermined volume, to open the seal element (11), whereupon a gas flow from the gas chamber (17) acts to deliver substance (5) from the delivery outlet (7).



SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA,
UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(84) **Designated States (regional):** ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

PCT/GB 03/02961

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 B05B11/06 A61M15/00 A61M15/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 IPC 7 B05B A61M B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, X	WO 02 056950 A (BECTON DICKINSON CO ;LOCKHART ARTIS R (US); MONAHAN LAWRENCE A (US) 25 July 2002 (2002-07-25) page 6, line 13 -page 10, line 18; figures 2-6 ---	1-5, 8-10, 12, 27, 29, 37-44
X	EP 0 407 276 A (VALOIS SA) 9 January 1991 (1991-01-09)	1, 2, 8, 9, 37-44
A	column 3, line 56 -column 5, line 54; figures 1-3 ---	3
P, X	US 2002/092523 A1 (CONNELLY ROBERT I ET AL) 18 July 2002 (2002-07-18) column 2, paragraph 31 -column 4, paragraph 51; figures 3,4 ---	1, 2, 29, 37, 38, 40-44 -/-

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the International search

Date of mailing of the International search report

23 October 2003

31/10/2003

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Jelercic, D

BEST AVAILABLE COPY

INTERNATIONAL SEARCH REPORT

PCT/GB 03/02961

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 98 58695 A (MERANTE FRANCESCO ; CECCHINI MARCO (IT); PERA IVO (US)) 30 December 1998 (1998-12-30) page 12, line 18 -page 15, line 23; figures 1,2 ---	1,2,8, 29,37-44
X	US 5 215 221 A (DIRKSING ROBERT S) 1 June 1993 (1993-06-01) cited in the application column 2, line 27 - line 57; figures 1-4 column 3, line 26 - line 49 ---	1,2,27, 29,41-44
A	US 1 715 986 A (BROWN EDWARD C) 4 June 1929 (1929-06-04) A page 1, line 52 -page 2, line 13; figures 1,2 ---	3-5 1,2, 14-16, 27,40-44 4,5,25
X	BE 483 886 A (DELFORTRIE JEAN FILS) 31 July 1948 (1948-07-31) A page 2 -page 3; figure 1 ---	1,2,14, 15,27, 40-44 4,5,24
X	DE 34 46 466 A (BADEWIEN REINHARD) 3 July 1986 (1986-07-03) page 8 -page 9; figure 1 ---	1,2,14, 15,27,41
X	FR 967 505 A (CREPIN & CIE H) 6 November 1950 (1950-11-06) A the whole document ---	1,2,14, 15,27, 40-44 4,5
A	FR 1 051 645 A (SARBACH LAB) 18 January 1954 (1954-01-18) the whole document ---	4-7
A	FR 2 753 438 A (OREAL) 20 March 1998 (1998-03-20) page 5, line 15 -page 7, line 12; figures 2A,2B, ---	11,17-20
A	US 4 457 453 A (FIRSTENFELD ANN H ET AL) 3 July 1984 (1984-07-03) column 3, line 6 - line 36; figures 1,2 ---	15,16
A	WO 00 21841 A (FERREIRO BUSTAMANTE MANUEL EDU) 20 April 2000 (2000-04-20) page 1, line 41 -page 2, line 37; figures 2,3 ---	13,14

INTERNATIONAL SEARCH REPORT

Information on patent family members

PCT/GB 03/02961

Patent document cited in search report	Publication date	Patent family member(s)			Publication date
WO 02056950	A 25-07-2002	US 2002092523 A1			18-07-2002
		US 2002092524 A1			18-07-2002
		EP 1351735 A2			15-10-2003
		EP 1351724 A2			15-10-2003
		EP 1349598 A2			08-10-2003
		EP 1349599 A2			08-10-2003
		WO 02055142 A2			18-07-2002
		WO 02055133 A2			18-07-2002
		WO 02056950 A2			25-07-2002
		WO 02060517 A2			08-08-2002
		US 2003047184 A1			13-03-2003
		US 2002092521 A1			18-07-2002
		US 2002092520 A1			18-07-2002
EP 0407276	A 09-01-1991	FR 2649323 A1			11-01-1991
		CA 2020425 A1			05-01-1991
		EP 0407276 A2			09-01-1991
		JP 3131271 A			04-06-1991
US 2002092523	A1 18-07-2002	EP 1351735 A2			15-10-2003
		EP 1351724 A2			15-10-2003
		EP 1349598 A2			08-10-2003
		EP 1349599 A2			08-10-2003
		WO 02055142 A2			18-07-2002
		WO 02055133 A2			18-07-2002
		WO 02056950 A2			25-07-2002
		WO 02060517 A2			08-08-2002
		US 2003047184 A1			13-03-2003
		US 2002092521 A1			18-07-2002
		US 2002092524 A1			18-07-2002
		US 2002092520 A1			18-07-2002
WO 9858695	A 30-12-1998	WO 9858695 A1			30-12-1998
		AU 3273497 A			04-01-1999
		EP 0991443 A1			12-04-2000
US 5215221	A 01-06-1993	AU 4116893 A			29-11-1993
		CA 2135189 A1			11-11-1993
		EP 0640018 A1			01-03-1995
		JP 7506279 T			13-07-1995
		TR 27578 A			13-06-1995
		WO 9322065 A1			11-11-1993
US 1715986	A 04-06-1929	NONE			
BE 483886	A	NONE			
DE 3446466	A 03-07-1986	DE 3446466 A1			03-07-1986
FR 967505	A 06-11-1950	NONE			
FR 1051645	A 18-01-1954	NONE			
FR 2753438	A 20-03-1998	FR 2753438 A1			20-03-1998
US 4457453	A 03-07-1984	NONE			
WO 0021841	A 20-04-2000	AU 6231299 A			01-05-2000

INTERNATIONAL SEARCH REPORT

Information on patent family members

PCT/GB 03/02961

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0021841	A	WO 0021841 A2	20-04-2000